

“There is no practical way to eliminate all mold and mold spores in the indoor environment; the way to control indoor mold growth is to control moisture.”

—U.S. Environmental Protection Agency



Fighting Mold in Your Home or Office:

Controlling Moisture through Better Building Practices



Helpful information on how to avoid mold in your home or office is published by the *Responsible Solutions to Mold Coalition (RSMC)*, an industry group devoted to educating the public and the building industry about effective ways to combat mold in residential and commercial construction.

What is mold and why is it an issue today?

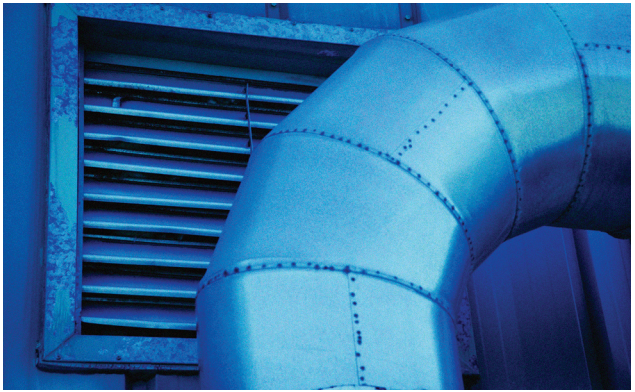
Mold is ubiquitous in nature. We come in contact with it on a daily basis. There are thousands of species of mold—most of them are harmless—but none of them will grow in the absence of water or moisture. The antibiotic penicillin is derived from mold, as is the brewing of beer. In fact, our ecosystem would not function without mold—mold turns grass, leaves and other yard waste into topsoil.



"A visual inspection is the most important initial step in identifying a possible contamination problem. The extent of any water damage and mold growth should be visually assessed. This assessment is important in determining remedial strategies."

—New York City Department of Health and Mental Hygiene

Mold has become an issue today because it's more prevalent, particularly in structures built during the past 25 years. The focus on improving energy efficiency resulted in more airtight homes that don't breathe like older structures. More complex home designs creates increased potential for moisture intrusion. In addition, under today's accelerated building schedules, buildings are subjected to the elements during all phases of construction, which can introduce and trap moisture within a building. It's important to note, however, that an energy-efficient home is not neces-



"Molds can be found almost anywhere; they can grow on virtually any substance, providing moisture is present."

—U.S. Environmental Protection Agency

$$\text{MOLD SPORES} + \text{MOISTURE} + \text{NUTRIENTS} = \text{MOLD}$$

sarily susceptible to mold. With proper design and construction, a home can be both energy-efficient and free from moisture-related problems.

What causes mold?

Mold spores waft through the air continually—indoors and out. When mold spores land on a damp spot, they begin digesting whatever they grow on to survive. Three conditions must always been present for mold to grow: 1) mold spores; 2) moisture; and 3) a food source upon which it can feed. Mold can grow on any surface—including steel, plastic and glass. A layer of dust provides enough nutrients to support mold growth. Of the three requirements to grow mold, only moisture can be controlled. Eliminating mold spores and all nutrients would require “clean room” technology, something that cannot be duplicated easily in spaces where we live and work.

Common causes of moisture and mold in buildings once they are completed include:

- Plumbing system leaks
- Air conditioning condensation
- Flooding
- Inadequate or incorrectly installed flashing around doors and windows
- Poor roof design (shallow overhangs or unprotected gable ends)
- Inadequate grading leading to poor site drainage
- Incorrectly installed insulation
- High indoor humidity exacerbated by inadequate ventilation
- Condensation caused by moist air moving in and out of the building envelope
- Large temperature differences
- Leaking ductwork

"While it is impossible to eliminate all molds and mold spores, controlling moisture can control indoor mold growth."

— U.S. Occupational Safety and Health Administration

Can mold cause health problems?

Research on the health effects of mold is ongoing. The general consensus is that mold does not represent a health issue for most people. However, mold does produce allergens, which are substances that can cause an allergic reaction. Allergic responses include hay fever-type symptoms such as sneezing, runny nose, red eyes and skin rash. In addition, mold exposure can irritate the eyes, skin, nose, throat and lungs of both mold-allergic and non-allergic people. It's important to note, however, that people who are allergic to pollen or even cat dander also experience the same symptoms. Generally, only people with asthma or compromised immune systems are likely to be affected by mold.



"Excessive indoor dampness should be addressed through a broad range of public health initiatives and changes in how buildings are designed, constructed and maintained."

—Institute of Medicine of the National Academies (U.S.)

How to effectively control mold by controlling moisture

It takes good building practices, which include:

- Good architectural design
- Quality building materials
- Manufacturing, shipping and storing building materials in a manner that keeps them dry before and during construction
- Building materials that are more susceptible to water damage should not be delivered to the construction site until they are ready to be installed
- Once building materials are delivered to the construction site, they should be covered by waterproof tarps
- In addition, it is important to keep building materials clean and dry. Soiled building materials provide a ready place for mold to grow
- Attention to the order in which building materials are installed so that items susceptible to moisture are not installed until the building is sufficiently enclosed
- Installation of insulation without gaps, folds or voids

- Using a continuous weather-resistant barrier with exterior walls
- Covering crawlspaces to control moisture
- Using exhaust fans to control moisture in bathrooms and kitchens
- Good maintenance procedures to keep dry buildings dry, which means that when a leak or a source of moisture is identified, it should be addressed as soon as possible

Are mold-resistant products the answer?

Mold-resistant materials play an important role in minimizing mold growth. The RSMC encourages everyone who is about to build or remodel a home to visit the Web sites of various building material manufacturers to read about innovative new mold-fighting products. However, if mold-resistant products are installed improperly, they offer little protection from the eventual growth of mold. Mold will grow on anything. It has nothing to do with whether the surface in question is organic (paper or wood, for example) or inorganic (glass, fiberglass or steel).

What are some mold-avoidance strategies?

One place to start is to reduce humidity to a range of 30 to 60 percent. Inexpensive devices that measure humidity can be purchased at electronics stores. Reducing humidity can be accomplished by venting to the outdoors bathrooms, dryers and other moisture-generating sources such as showers, stoves and dishwashers. During the summertime, air conditioners and dehumidifiers can make a difference. If you live in a cooler, less humid environment, you can also minimize mold by opening doors and windows to increase airflow whenever practical. Also, reduce the potential for condensation on cold surfaces by

adding insulation around windows, piping, exterior walls, roofing and floors. Don't install carpeting in areas where there is perpetual moisture, such as bathrooms, kitchens or on concrete floors that may become damp. If you have a humidifier on your furnace, be sure to turn it off during the summer months.



"Fix the source of the water problem or leak to prevent mold growth."

—U.S. Environmental Protection Agency

What should I do if I find mold in my home or office?

There are a variety of sources of useful information on mold control and removal listed at the end of this brochure. If you discover mold, try to find the source of the moisture and correct it as soon as possible. If there is a small patch of mold, you can clean it with a combination of detergent or household cleaners and warm water. The area should be rinsed with clear water and then dried thoroughly. It's important to avoid soaking the damaged area, thereby setting the stage for the return of mold. Absorbent materials such as ceiling tiles, wallboard and carpet that become moldy may need to be replaced. If you decide to tackle the job yourself, wear rubber gloves and discard both the gloves and your cleaning cloths when you're done. If you discover that mold has grown



“Moisture and mold problems stem from building design, construction and maintenance practices, and building materials in which wetness lingers.”

—Institute of Medicine of the National Academies (U.S.)

across large areas, you should contact a mold abatement specialist. These companies can help eradicate the mold, as well as identify and eliminate the source of moisture that is causing the problem.

Moisture control and best building practices are the key to fighting mold

At the end of the day, there is only one truly effective strategy to eliminate mold: embrace best building practices and eliminate sources of unwanted moisture and water. There is an important role for mold-resistant products when the unexpected leak or flood occurs, but there are no “silver bullet” solutions to avoiding or eradicating mold. Buildings must be well built and well maintained to eliminate mold.

Myths about Mold

1. Mold grows only on paper, wood and other organic material

Mold will grow on any surface, including glass, fiberglass and even steel. Mold needs three things to grow: 1) mold spores (which are almost always in the air); 2) moisture; and 3) a food source. Houses are constructed using a wide variety of organic materials; therefore, the only effective strategy to control mold is to control moisture.

2. Mold can be eliminated

We all benefit from some molds such as the species that led to the development of penicillin. Only “clean room” technologies—which are too expensive and unnecessary for the home or office—can eliminate mold spores. Therefore, the only thing you can control in your home or office is moisture.

3. Only experts can clean mold

Homeowners can clean small patches of mold using household detergents and warm water. After cleaning, rinsing and drying the spot where mold has grown, rubber gloves and cleaning cloths used in the process should be discarded. Larger patches of mold may need to be eliminated by trained professionals.

4. Once mold starts, it will always be present

Mold can be stopped in its tracks, but only if moisture is minimized or eliminated. Therefore, leaks should be corrected as soon as they become apparent. Building experts urge homeowners to be aware of some of the telltale signs of mold, which include dampness, odors, discoloration, peeling paint, condensation, compacted insulation and actual mold outbreaks.



"The key to mold control is moisture control."

—U.S. Environmental Protection Agency

Please consult the following Web sites and resources for more information on mold and mold abatement:

U.S. Environmental Protection Agency:
www.epa.gov/iaq/molds

New York City Department of Health and
Mental Hygiene:
www.nyc.gov/html/doh/html/epi/moldrpt1.shtml

U.S. Occupational Safety & Health Administration:
www.osha.gov/dts/shib/shib101003.html

National Institute of Medicine of the
National Academies:
www.iom.edu/object.file/master/25/863/0.pdf

Sponsored by a grant from USG Corporation





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